

in this country, and Mr. Rothschild has stated (Avifauna of Laysan, p. 97) that Lafresnaye's type is in the Paris Museum. On this point he must have been misinformed, and the specimen he "carefully examined" there was probably one of the pair obtained and presented by Néboux (Revue Zoologique, 1840, p. 289), from which presumably the figures in the Voyage of the 'Vénus' (Ois. pl. i. figs. 1, 2) were taken. It is almost needless to remark that had the present example been attainable by Mr. Wilson he would never have supposed it to be specifically identical with the bird which he found in Hawaii; and I may observe that not one of the five examples of the *Hemignathus lucidus* of Oahu at his disposal—two from Berlin, two at Cambridge, and one in the British Museum—was that of a male in full plumage.

Mr. W. B. Tegetmeier, F.Z.S., exhibited an interesting application of the Röntgen rays to ornithology, in the shape of an actinograph taken from a Partridge that had "towered" on being shot. The actinograph seemed to show that the "towering" was caused by injury done to the lungs, and not by lesion of the brain, as often supposed.

The following papers were read:—

1. Contributions to our Knowledge of the Plankton of the Faeroe Channel.—No. I. By G. HERBERT FOWLER, B.A., Ph.D., Assistant Professor of Zoology, University College, London.

[Received November 3, 1896.]

(Plate L.)

Between July 29th and August 8th of this year I enjoyed the great advantage of a berth on H.M.S. 'Research,' by the permission of the Lords Commissioners of the Admiralty, extended to me at the request of the Council of the Royal Society. I am glad of this opportunity to tender my thanks, not only to both of these bodies, but also to Capt. Moore and the other officers of the 'Research' for placing at my disposal every facility that lay in their power.

My chief object on the cruise was an attempt to ascertain whether the intermediate zones of water between (say) 100 and 700 fathoms are characterized by definite forms of planktonic life or not; and if so, what temperature-limits form barriers to the distribution of various species. The large number both of surface and deep-water organisms obtained during the cruise will demand so long a study that it seems best to publish results as soon as obtained in the scant leisure of which a teaching post admits. The present note forms, therefore, the first of a series, in which

the methods employed and the general questions of distribution will be left to the last paper.

SAGITTA WHARTONI, sp. n.¹ (Plate L. figs. 1-3.)

In external form this species resembles most nearly *S. lyra* (Krohn), and differs from all other species yet described in the approximation, almost fusion, of the paired lateral fins. From Krohn's species, however, it is easily distinguished by the absence of a constriction between body and trunk and by the numbers of the teeth and cirrhi.

The head is large, 3-4 mm. wide and 2 mm. long in a specimen 45 mm. long. It bears on each side 8-10 stout cirrhi (Greifhaken), which are strongly curved, and of which the middle three are the longest. The accessory teeth (Nebenkiefer) are arranged in two series, of which the more dorsal are 3-5 in number and are short and stout; the more ventral are 5-7 in number and are slighter and longer. The neck is somewhat thinner than the body. The body tapers without constriction to the tail; the latter (post-septal region) is less than one-fourth of the total length. The lateral fins are set rather far back, the anterior being much longer and narrower than the posterior.

The longest specimen measured 45 mm. The following dimensions are taken from well-preserved straight specimens, of which A was apparently uncontracted, B contracted considerably antero-posteriorly:—

	A.	B.
Total length	30 mm.	38 mm.
Head, "	1	2
Body, "	23	26
Tail, "	6	10
Neck, width	1.5	3
Body, width at widest . . .	2	4
Anterior fin, length	20	18
" " width	3	6
Posterior fin, length	10	7
" " width	4	9
Tail-fin, width	3	6

It is curious that this species should not have been taken by the Plankton Expedition, which records ² *S. bipunctata* from the north of Scotland. From this it is distinguished readily by the approximation (continuity) of the lateral fins.

From *S. hexaptera* it is further distinguished by the size of the head, by the slightly more backward position of the posterior lateral fin, by the possession of more numerous cirrhi, and by the absence of the five-rayed star on the accessory teeth (*cf.* Strodtmann, *loc. cit.*).

¹ In honour of Admiral Wharton, R.N., the Hydrographer, a steady friend to oceanic research.

² Strodtmann, "Systematik der Chaetognathen," Arch. für Naturgeschichte, lviii. Band i. pp. 333-376, pl. xvii.

From *S. bipunctata* it is readily distinguished by the number of teeth in the accessory rows and the proportions of tail to body.

A row of stout processes is placed on the ventral side of the rows of accessory teeth. These appear to correspond to the "follicoli vestibolari" of Grassi; but in forming a single row they differ from those which he figures as characterizing *S. hexaptera*¹.

I have been unable to detect any trace of a "corona cigliata" (Riechorgan) on the dorsal surface of the head and neck.

This species² appears to be present in both the "cold" and the "warm" areas³ of the Faeroe Channel, and to be a characteristic component of the "Mesoplankton," *i. e.* the floating and swimming organisms between a depth of ± 100 fathoms below the surface and a depth of ± 100 fathoms from the bottom.

Horizontal distribution: 61° 18' N., 4° 21' W., to 59° 42' N., 7° 7' W.

Vertical distribution:—

Greatest depth—warm area—Sta. 19 *a*, 480 to 350 fathoms; temp. 46° to 47° F.

Greatest depth—cold area—Sta. 13 *g*, 465 to 335 fathoms; temp. 31° to 33° F.

Least depth—Sta. 13 *i*, 100 to 0 fathoms; temp. 48° to 54° F.

The least depth given above was the only occasion on which it was taken anywhere near the surface, except for one doubtful and broken specimen at the surface at midnight (Sta. 15). There is no doubt that this species is essentially Mesoplanktonic, with a very wide temperature range (at least 33° to 48° F.); it occurred in every haul, but one, of those made between 530 and 100 fathoms (*i. e.* in eight out of nine hauls); it occurred in every haul which began at or lower than 300 fathoms and finished at the surface (three hauls); and was taken, certainly, only once in a haul which began at 100 fathoms and ended at the surface (once out of twenty-two hauls).

SPADELLA (KROHNIA) HAMATA, Möbius. (Plate L. fig. 4.)

Having obtained a large number of well-preserved specimens of this species, I think it worth while to give an outline (fig. 4) of the external form, since both the original figure of Möbius⁴ (which has been simply copied by Hertwig⁵ and by Grassi⁶) and also the

¹ Grassi, *loc. cit. infra*, pl. iii. fig. 6.

² I am anxious to leave the discussion of the bathymetric limits of the species taken on H.M.S. 'Research,' and of the means used to determine these limits, till the material has been more fully investigated. At the same time, in describing a new species it is necessary to provisionally indicate the depth at which it was taken; but remarks under this heading must be for the present considered as *provisional*, except in the case of surface forms.

³ For an explanation of these areas, see Wyville Thomson, 'Depths of the Sea,' London, 1874. 8vo.

⁴ Jahresb. Commis. wissenschaft. Untersuch. deutschen Meere, Jahrg. ii., jii. p. 158, pl. iii. fig. 13.

⁵ "Die Chaetognathen," Jenaische Zeitschrift, xiv. pl. ix. fig. 7.

⁶ "I Chetognati," Fauna und Flora Golf. Neapel, v. pl. i. fig. 5.

more recent figure of Strodtmann¹, owing doubtless to ill-preserved material, are capable of improvement in respect of the lateral fins. There can be no doubt that the 'Research' specimens are referable to this species, since they agree with Möbius's description and figures of the cephalic armature to the minutest detail.

This species appears to be an essentially northern form. It was originally described by Möbius from the following localities:—N. of Hænsthølm, Korsfjord (twice), and N.W. of Skagen (misprinted S.W., *loc. cit.* p. 158) during the cruise of the 'Pommerania,' 1872.

It was recorded by Levinsen² from Greenland (Kronprinsens Eiland), from 30 m. W. of Cape Farewell, and from lat. 59° N., long. ?; lat. 57° 50' N., long. 48° 43' W.; lat. 57° 48' N., long. 43° 45' W.

Strodtmann records it from the North Atlantic Drift ("Gulf-stream"), Irminger (Greenland) Sea, and the Labrador Current, *i. e.* from 60° to 50° N. latitude, as having failed in no single haul made by the 'National' (Plankton Expedition) in 1889.

In the Faeroe Channel it was rarely absent from a tow-net.

The deepest haul in which I obtained this species was in the warm area—Sta. 19 *a*, 480 to 350 fathoms; temperature 46° to 47° F. It may be regarded as having a fairly wide range of temperature (eurythermal), since it was obtained from the surface at a temperature of 53° F. (haul 15 *b*), and at a temperature of less than 33° F. (haul 13 *g*, 31° to 33° F.) in the cold area.

These four instances are, I believe, the only records of the occurrence of the species.

In illustration of the ease with which one may fail to collect specimens of a fairly plentiful species, may be cited two successive hauls, made within an hour of each other:

Haul 19 *a*, 480 to 350 fm., gave 6 specimens of *S. hamata*.

„ 19 *b*, 480 to 0 „ 0 „ „

In other words, 6 were caught in towing through 130 fm. of water, none in towing through 480 fm. (*cf.* Strodtmann, *loc. cit.* p. 367) with the same net at the same place.

SALPA ASYMMETRICA, sp. n. (Plate L. figs. 5–8.)

As was the case with most Salpæ collected on the 'Research,' the specimens of this species were considerably damaged by pressure against the tow-net, owing to the heavy rolling of the ship when heaved to. Not all anatomical details could therefore be satisfactorily made out, but the following appear to be good characters:—

EXTERNAL CHARACTERS.—Body ovoid, flattened, devoid of processes. Apertures in *solitary form* terminal; apertures in *sexual*

¹ "Systematik der Chaetognathen," Arch. Naturgeschichte, lviii. Bd. i. pl. xvii. fig. 17.

² "Om nogle pelagiske Annulata," Vidensk. Selsk. Skrifter, (6) iii. 321.

form, mouth dorsal, cloaca terminal. Surface smooth. Length of sexual form 12 mm.

TEST clear, transparent, thin.

MANTLE.—In the *sexual form* the musculature exhibits an asymmetry similar to that already described in *S. dolichosoma-virgula*, *musculosa-punctata*, and *magathanica*¹. The mouth has a pair of sphincters, apparently formed by splitting of two lateral longitudinal muscle-slips. At least one sphincter surrounds the cloacal aperture; but the arrangement of the musculature of both apertures was extremely difficult to make out, owing to the bad condition of the specimens. The order, or rather the disorder, of the main muscles is more easily appreciated from drawings than from a description (Plate L. figs. 5, 6, a-f). In addition to these there are two dorsal longitudinal muscle-slips, a dorsal sheet overlying the nucleus, and a fan-like sheet on the right of the nucleus.

In the *solitary form*, extracted with the placenta from the parent, the musculature is much more regular; it consists of eight complete bands, two large and (?) four small circumcloacal sphincters (the arrangement of which could not be exactly ascertained), a right and a left longitudinal slip of unequal length in connection with the two circumoral sphincters.

ENDOSTYLE fairly long and straight.

DORSAL LAMINA large (diam. in posterior third about 5 mm. in sexual form), with strongly-marked ridges. No languet was detected.

DORSAL TUBERCLE large, about 5 mm. in length in sexual form; transversely marked with fine bands of cells.

VISCERAL MASS comparatively small, brownish yellow in life.

At first it seemed probable that one was dealing merely with a specimen curiously broken, and that the asymmetry was artificial. But specimens of this species were taken on many occasions, and all possibility of the above explanation was destroyed when I obtained several specimens which presented the same asymmetry, but in a "Spiegelbild," namely the reversal which would be produced by a reflection in a mirror. The same reversal or "inverse image" has been discussed at length by Apstein² on the basis of the three asymmetrical genera cited above.

As the 'Ergebnisse der Plankton Expedition' are not readily accessible to everyone, and as the point is novel and of some interest, I quote Apstein's conclusions:—"Bei den übrigen Salpen, die eine symmetrische Muskulatur haben, ist Spiegelbild und Kongruenz dasselbe, bei einem unsymmetrischen Körper aber fallen Spiegelbild und Kongruenz nicht zusammen. Ich glaube jedoch, dass bei allen Salpen in der Kette die Individuen der eine Reihe gleich, d. h. kongruent sind, aber zu denen der anderer Reihe spiegelbildlich sich verhalten, aber dass dies in der Muskulatur

¹ Apstein, 'Ergebnisse der Plankton Expedition: Die Thaliacea.—B. Verteilung der Salpen,' p. 17.

² Apstein, *loc. cit.* p. 17.

meist nicht zu sehen ist, weil fast alle Salpenarten symmetrische Muskeln haben."

This adds an eighteenth species to the list of *Salpæ* occurring in the North Atlantic. It was obtained at two stations (four hauls) in small quantities: Sta. 13, 60° 2' N., 5° 49' W.; and Sta. 19, 59° 42' N., 7° 7' W. On these four hauls it was at the surface; in two more hauls at the same stations it was also taken from uncertain horizons with an open tow-net, probably at or near the surface.

EXPLANATION OF PLATE L.

Sagitta whartoni, sp. n. (p. 992).

Fig. 1. Ventral view. $\times 2$.

Fig. 2. Dorsal view of head, showing some of the cirrhi, the two rows of accessory teeth, and the row of sensory processes. Cam. luc. $\times 12$.

Fig. 3. Cephalic armature. *a*, end of cirrhus; *b*, tooth of ventral row; *c*, tooth of dorsal row. $\times 210$.

Spadella (Krohnia) hamata (p. 993).

(Drawn by camera lucida.)

Fig. 4. Ventral view. $\times 2$.

Salpa asymmetrica, sp. n. (p. 994).

<i>a-f.</i> main muscles of the mantle.	<i>en.</i> endostylo.
<i>at.</i> atriopore.	<i>nc.</i> nerve-ganglion.
<i>cl.</i> cloaca.	<i>nu.</i> nucleus.
<i>dl.</i> dorsal lamina.	<i>pl.</i> placenta.
<i>dt.</i> dorsal tubercle.	<i>st.</i> stolon.
<i>el.</i> elæoblast.	

Fig. 5. Sexual form, dorsal aspect. $\times 4.5$.

Fig. 6. Sexual form, ventral aspect. $\times 4.5$.

Fig. 7. Solitary form, right side. $\times 16$.

Fig. 8. Solitary form, left side. $\times 16$.

2. On the Occurrence of a Pair of Supernumerary Bones in the Skull of a Lemur and on a Peculiarity in the Skull of a young Orang. By ROBERT O. CUNNINGHAM, M.D., F.L.S., F.G.S., C.M.Z.S., Professor of Natural History, Queen's College, Belfast.

[Received November 9, 1896.]

A short time ago, when taking part in an oral examination on zoology at the Royal University of Ireland, Dublin, I was somewhat surprised to recognize in the skull of a common Lemur a small pair of supernumerary bones intervening between the frontals, nasals, and lachrymals. As I could not find any reference to such bones in any of the works on comparative anatomy at my disposal, I wrote to Sir William Flower, as our highest authority on the osteology of the Mammalia, to ask him if he could furnish me with any information on the point. He kindly handed my letter with its accompanying sketch to Dr. Forsyth Major, who showed him a skull with exactly the same bones, observing that